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EDMS - Microcomputer Pollution Model for Civilian Airports and Air Force Bases: USER'S GUIDE

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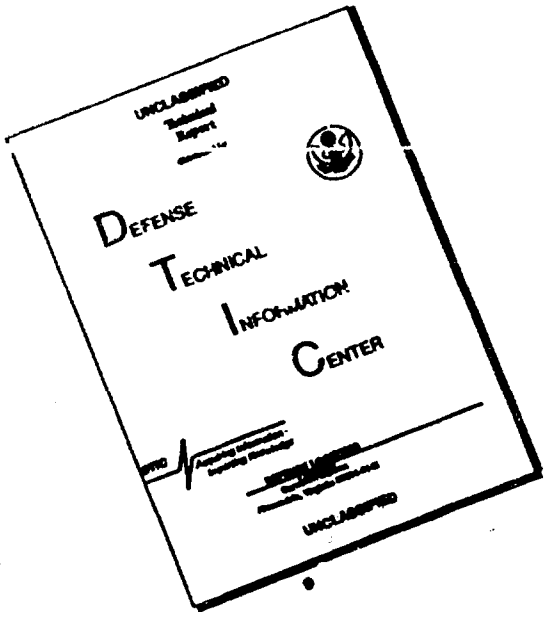

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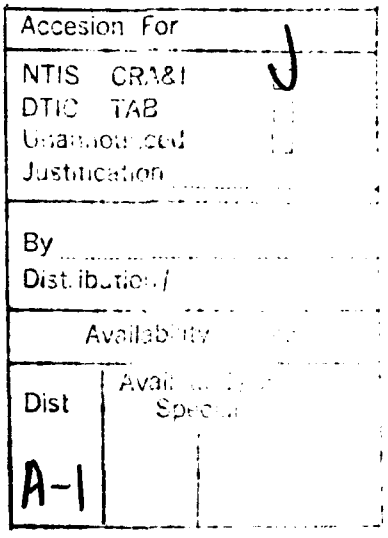

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16. Abstract

This report represents the final release of the User's Guide for the Emissions and Dispersion Modeling System (EDMS). It provides special instruction for performing air quality assessments at airports and airbases and contains a 94 step example problem to familiarize the user with the model.

This report supersedes the August 1988 release of the "Beta" User's Guide (report number FAA-EE-88-6/ESL-TR-88-54) and incorporates the following model improvements suggested by "Beta" users:

1. A more detailed description on how to use the temporal files.
2. A separate explanation on how to calculate the length of aircraft queues.
3. Data on how long it will take to run a scenario on EDMS.
4. Explicit instructions on how to access stored emission rate data.
5. Enhanced screen displays.
6. A simplified file processing system that is menu driven.

This document is one of 3 EDMS reports with the same main title but different sub-titles. These sub-titles are:

1. USER'S GUIDE (FAA-EE-91-3/ESL-TR-91-31)
2. MODEL DESCRIPTION (FAA-EE-88-4/ESL-TR-88-53)
3. MODEL APPLICATION AND BACKGROUND (FAA-EE-88-5/ESL-TR-88-55)

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1 - INTRODUCTION

Before starting an airfield improvement project or changing the numbers, types, or activity of aircraft at an airfield, an air quality assessment is usually required. This assessment is usually made with an emissions/dispersion model.

Two emissions/dispersion models were developed in the early 1970s for use at airports and airbases. The United States Air Force (USAF) developed the Air Quality Assessment Model (AQAM) (Rote, et al., 1975), and the Federal Aviation Administration (FAA) developed the Airport Vicinity Air Pollution model (AVAP) (Wang, et al., 1973). However, these models are obsolete -- they are expensive to operate, tedious to enter data into, and since they were not approved by the Environmental Protection Agency (EPA), had to be "sold" for each application.

Both the FAA and the USAF noticed that microcomputer advances of the 1980s' could significantly improve airfield modeling. They also noticed that the FAA's and the USAF's modeling requirements were quite similar. It was therefore concluded that the FAA and the USAF should join forces to develop a single modeling system that both agencies could use.

This single modeling system is called the Emissions and Dispersion Modeling System (EDMS). It compensates for AQAM and AVAP limitations by employing the new modeling concepts developed in the "Simplex A" (Segal, 1981) and "GIMM" (Segal, 1983) microcomputer models and uses a commercial database for data entry. These enhancements permit a qualified technician to perform a modeling task that had been previously reserved for a highly skilled scientist or engineer.

EDMS is a refined model designed for use on a microcomputer. It employs special table lookup and numerical integration procedures to permit a microcomputer to perform the tasks that had previously been done on a mainframe computer. These special procedures, along with other features of EDMS, are described in the model description report (Segal and Hamilton, 1988).

Figures 1, 1A, and 2 show the system flow and menu structure of EDMS.

System Flow - Emissions Model

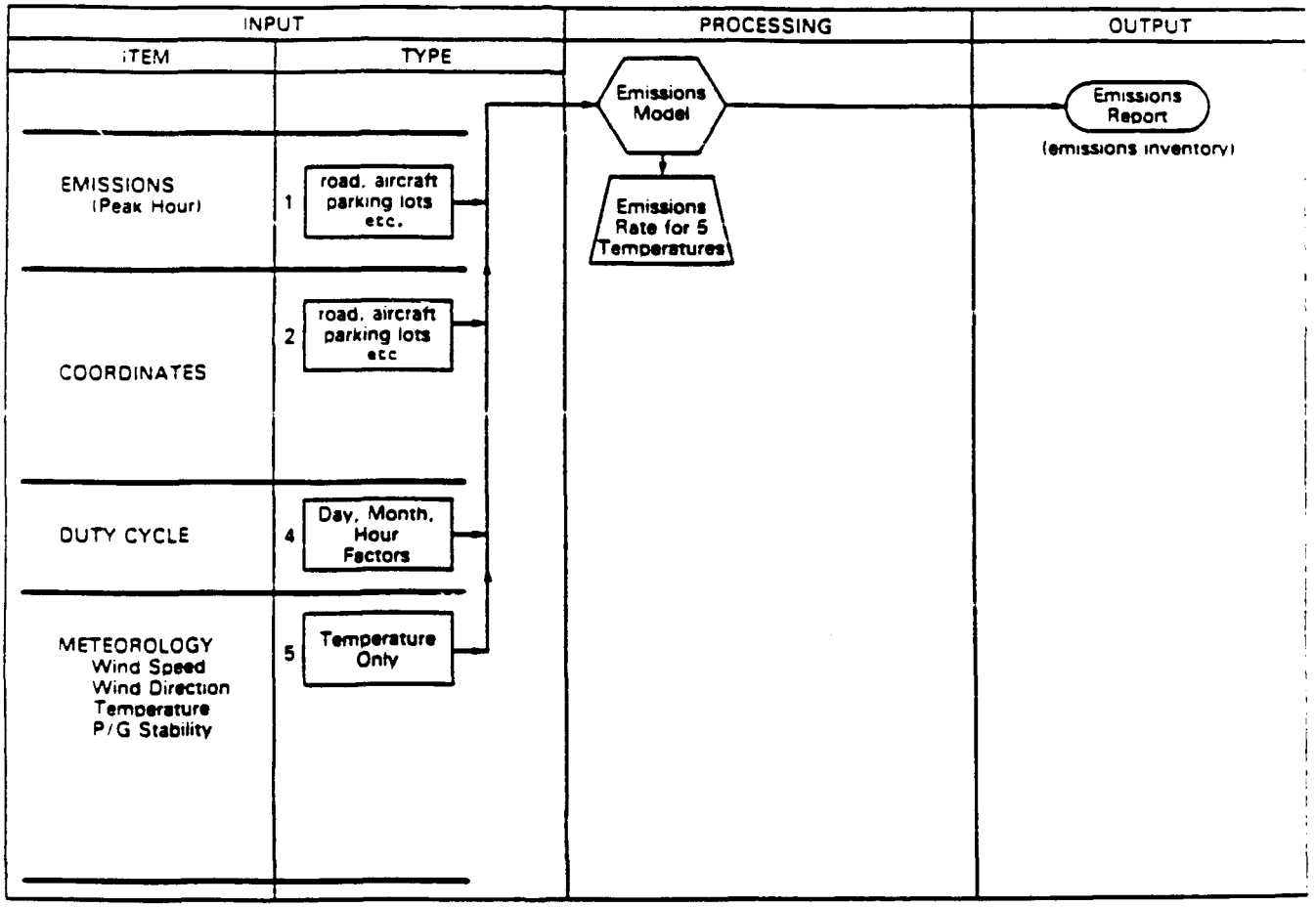
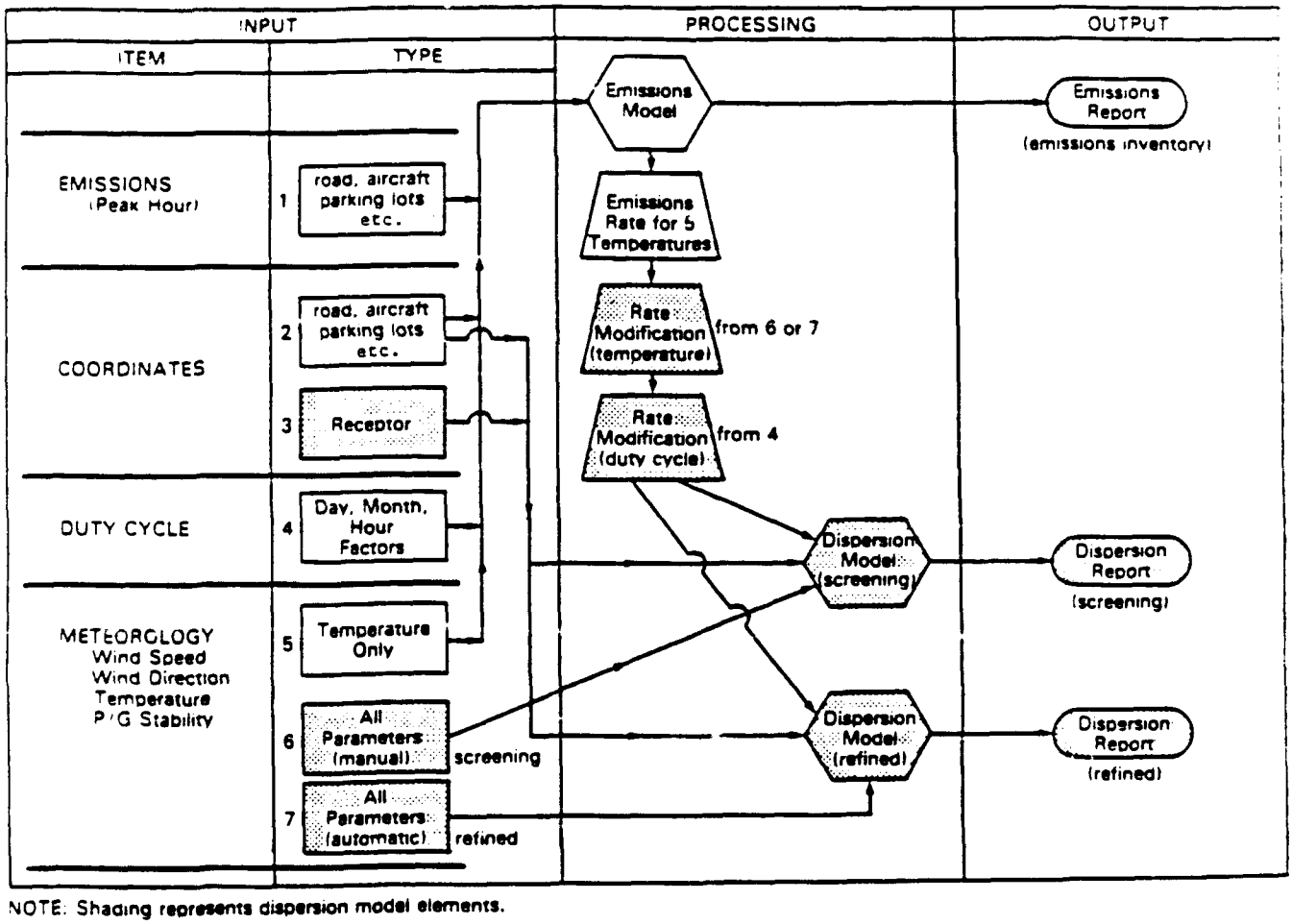


FIGURE 1

System Flow

Emissions and Dispersion Model



NOTE: Shading represents dispersion model elements.

FIGURE 1A

Menu Flow

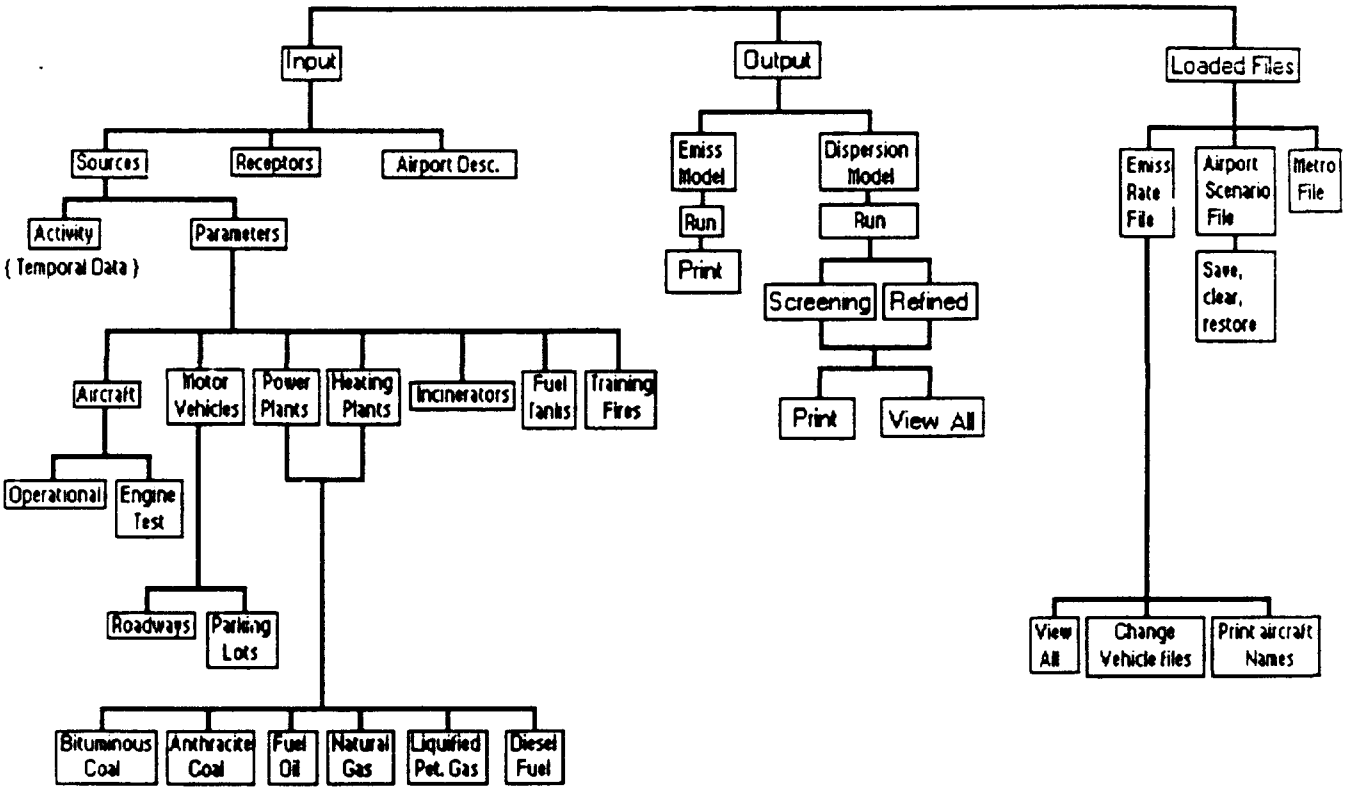


FIGURE 2

2 - APPROACH

A "hands on" example problem is used to demonstrate EDMS. The user has only to read two short sections before starting this "hands on" learning experience. The first section describes hardware and software requirements and the second explains how to load the model.

After running the example problem, the user can check his or her results with a master solution of the example problem appearing in Appendix A.

The last two sections provide answers to questions that a user may ask when he is performing a formalized air quality assessment.

Since yearly supplements to this Guide are planned, we welcome recommendations for model improvements. Contacts are Mr. Howard Segal of the FAA (202-267 3494) and Captain Michael Moss of the USAF (904-283 6034). Mailing addresses are listed in items 9 and 12 of the Technical Report Documentation Page, the second page in this report.

3 - SYSTEM SET-UP

3.1 HARDWARE

EDMS requires the following hardware:

1. An IBM PC/XT/AT or compatible computer.
2. At least 400 kilobytes of free memory.
3. One floppy disk drive.
4. One hard drive with at least 5 megabytes free. (This hard drive must be designated as the "C" drive.)

In addition the following items should enhance model performance:

1. A computer with an 80386 processor and an 80387 coprocessor.
2. An additional 10 megabytes on the hard drive.

3.2 SOFTWARE

EDMS requires the following software:

1) MS-DOS version 2.1 or higher

2) 2 diskettes containing the EDMS code

Note: These diskettes can be purchased for $40 from the :

Federal Aviation Administration
800 Independence Avenue, SW.
AEE-120
Washington, D.C. 20591
Attn: Howard M. Segal
Telephone: (202) 267-3494

3.3 INSTALLATION OF CODE

Loading ins_ructions are as follows:

1. The CONFIG.SYS file of the computer must have its FILE and BUFFER commands set at 30 or above.

Note: Reboot the computer if you change these settings.

2. Clear old versions of EDMS from the hard drive.
3. Create a subdirectory called "EDMS".
4. Insert disk #1 into the "A" drive.
5. Type "COPY A:*.* C:\EDMS*.*"
6. Repeat Steps #4 and #5 for second disk.

4 - EXAMPLE PROBLEM

4.1 INTRODUCTION

This section is in 3 parts. The first, AIRPORT SCENARIO, shows the layout of the airport and the location of its sources and receptors. The second, GIVEN INFORMATION, lists the emission values assigned to these sources. The third, INSTRUCTION TO RUN MODEL, provides instructions for running the model.

4.2 AIRPORT SCENARIO

This "hands on" example problem is set at Washington National Airport (DCA) and uses 6 of the 19 possible sources shown in Figure 3. The sources are:

One power plant (source G)
One runway (source C)
Two roadways (sources D and E)
One parking lot (source F)
One takeoff queue (source B)

Note: The user enters the locations of possible queues at both ends of the runway. The model selects the appropriate queue after processing wind direction information since the model assumes takeoff into the wind.

The origin of the airport coordinate system is located in the lower left hand corner of the map (Figure 3) and north is assumed to be at the top of the map.

4.3 GIVEN INFORMATION

4.3.1 SOURCES

4.3.1.1 Hourly Changes in Source Activity

In the model, source activity factors ranging from "1" (for 100 percent activity) to "0" (for 0 percent activity) are entered into the duty cycle (or temporal screen). These factors are entered into 43 fields — 24 "hour" fields, 7 "day" fields, and 12 "month" fields. These data are processed to produce emission rates for every hour of the year (8760 hours).

A more detailed description of the temporal files is contained in section 6.2.

Source - Receptor Geometry At Washington National Airport

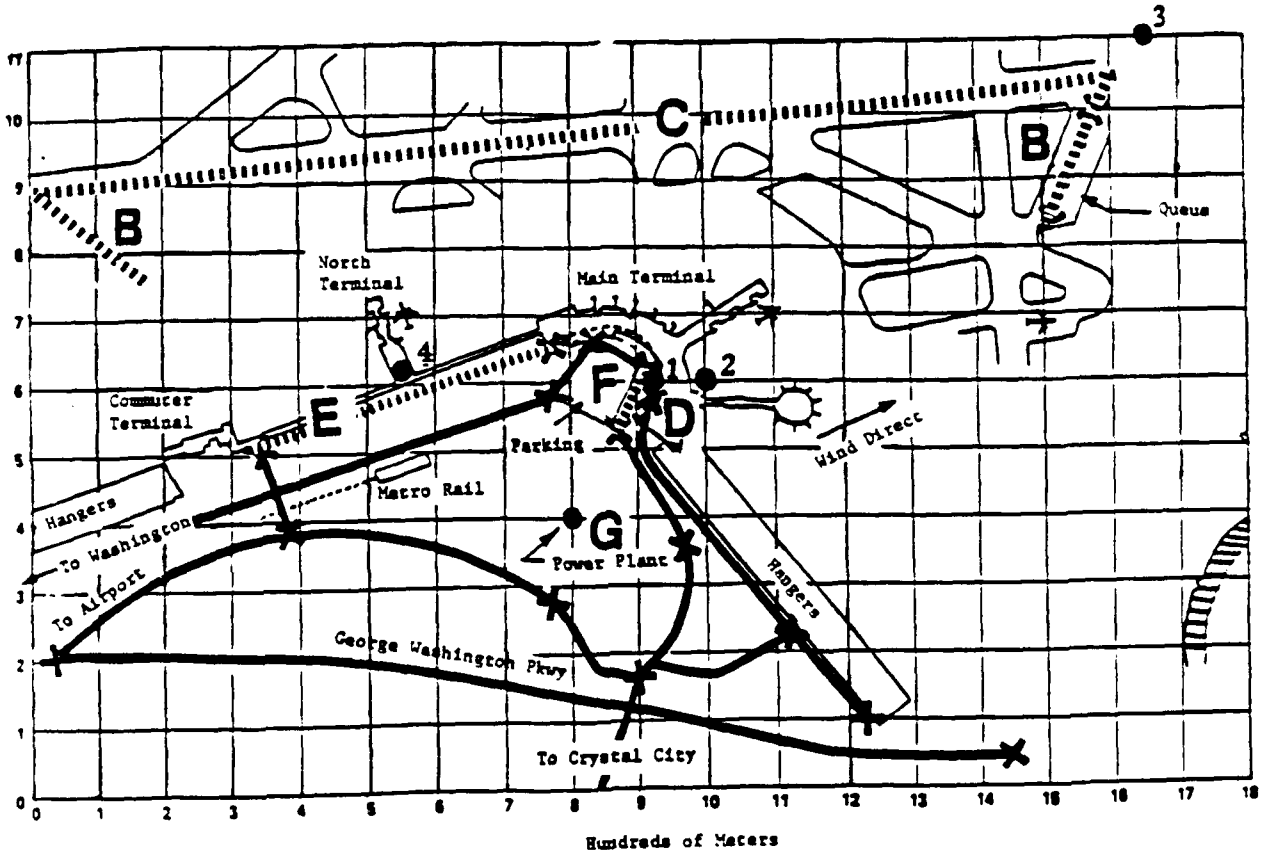


FIGURE 3

4.3.1.2 Source inputs

Table 1 lists source characteristics.

TABLE 1

SOURCE INPUTS
(refer to Figure 3)

Source	Coordinates (M)				Source * Activity	Duty Cycle	
	x1	y1	x2	y2		Record Name	% Activity (Temporal Factor)
Power Plant G	800	400			4 m tons/hr bituminous coal	POWER	100% activity for all days, months & hours
Runway C	1600	1050	000	900	10 DC9s/hr. 12 727s/hr.	SCENARIO	0800 - 90% activity 0900 - 60% activity Aug - 60% activity all other activity is 100%
Queue B	150	760	1500	820	10 DC9s/hr. 12 727s/hr.	SCENARIO	same as "runway"
Roadway E	320	500	770	660	340 veh/hr 15 mi/hr 20% cold	SCENARIO	same as "runway"
Roadway D	880	530	910	610	1500 veh/hr 5 mi/hr 20% cold	SCENARIO	same as "runway"
Parking Lot F	870 830	520 660	910 770	620 580	150 veh/hr 5 mi/hr 80% cold	SCENARIO	same as "runway"

* Source activity for the peak hour of the year.

4.3.2 RECEPTORS

Receptor coordinates are listed below.

Receptor Name	"X" Location (meters)	"Y" Location (meters)
#1 Main Terminal	920	600
#2 South of Main Terminal	1000	600
#3 Runway - North End	1650	1100
#4 North Terminal	550	610

4.3.3 METEOROLOGICAL DATA

Meteorological inputs are required in both the screening and refined runs.

SCREENING RUN

Parameter	Hourly averaged values
Wind speed (meters/second)	1
Wind direction (degrees)	225
Air temperature (degrees F.)	70
Pasquill/Gifford stability (1-6)	2

Note: Stability classes 1 - 6 corresponds to Pasquill/Gifford stability classes A - F.

REFINED RUN

Meteorological data must be loaded into EDMS before starting a refined run. However, the user will not have to load a meteorological file before running the example problem because one such file has already been loaded into the model.

To further reduce run time, only two hours of meteorological data are scheduled to be processed; one for 0800 hours and the other for 0900 hours.

4.4 INSTRUCTIONS TO RUN MODEL

The example problem instructions incorporate some special notations. The word ENTER in the text means that the carriage return key (↵) should be pressed. Text entries must all be in upper (or lower) case since the data base distinguishes between upper and lower case characters. Quotes around numbers, characters, or words are for identification only. They are not to be typed in.

The 94 step example problem is listed below. The flow chart of Figure 2 should prove helpful if the user gets lost while running the example problem.

PREPARE FOR DATA ENTRY

	ACTION	PURPOSE
1	turn on computer, monitor and printer	activate system
2	type "C:" ENTER	make sure the system is in the "C" drive
3	press CAPS LOCK key	set for upper case entry *
4	type "CD\EDMS" ENTER	change to the EDMS directory
5	type "EDMS" ENTER	execute EDMS program within the EDMS directory

NOTE:- Because EDMS is delivered with empty input screens, the user will not have to empty these screens before running the example problem. However, before a new scenario can be started, all its input screens must be empty. Option 8 of the main menu shows how to empty these screens.

* Case can be either upper or lower.

ENTER FACILITY DATA

6	type "4" ENTER	select airport description / temperature screen
7	type "R"	select revise (R) option

NOTE: The letters "R" for revise, "E" for End (or save), "C" for Continue, and "Q" for Quit are noted at the bottom of the screen.

8	press ENTER eight times	bypass airport description fields which are for user convenience only. These fields are not read into the model.
9	intentionally blank	
10	intentionally blank	
11	intentionally blank	
12	press "70" 12 times	enter 70 degrees 12 times
13	type "E"	save data
14	press ENTER	return to main input menu

ENTER TEMPORAL DATA

15	type "2" ENTER	select TEMPORAL option
16	type "1" ENTER	select "add" option
17	type "POWER" ENTER	enter temporal record name
18	type ENTER 43 times	enter 1.0 for 100%
19	type "C"	save first record "POWER"; then continue
20	type "SCENARIO" ENTER	start the second record (see Table 2)
21	press ENTER 8 times	enter default (1.0)
22	type ".9" ENTER	enter 90% (for 0800 hours)
23	type ".6" ENTER	enter 60% (for 0900 hours)
24	press enter 28 times	enter 100%
25	type ".6" ENTER	enter 60% (for August)
26	press ENTER 4 times	enter 1.0 into remaining fields
27	type "E"	save
28	type "11" ENTER	return to the main menu

TABLE 2

T E M P O R A L A C T I V I T Y

Temporal name SCENARIO

Hourly factors:

0 1.00	1 1.00	2 1.00	3 1.00	4 1.00	5 1.00
6 1.00	7 1.00	8 0.90	9 0.60	10 1.00	11 1.00
12 1.00	13 1.00	14 1.00	15 1.00	16 1.00	17 1.00
18 1.00	19 1.00	20 1.00	21 1.00	22 1.00	23 1.00

Daily factors:

Sun 1.00	Mon 1.00	Tue 1.00	Wed 1.00
Thu 1.00	Fri 1.00	Sat 1.00	

Monthly factors:

Jan 1.00	Feb 1.00	Mar 1.00	Apr 1.00	May 1.00	Jun 1.00
Jul 1.00	Aug 0.60	Sep 1.00	Oct 1.00	Nov 1.00	Dec 1.00

ENTER SOURCE DATA - POWER PLANTS

29	type "1" ENTER	select sources — data menu
30	type "3" ENTER	select power plants
31	type "1" ENTER	select bituminous
32	type "1" ENTER	display data entry screen
33	type "POWER" enter	enter temporal name
34	type "PUGET POWER #1" ENTER	enter the name of the power plant
35	type "800" ENTER	enter X coordinate (meters from origin)
36	type "400" ENTER	enter Y coordinate
37	press ENTER 5 times	enter defaults
38	type "2" ENTER	enter plant class
39	type "35040" ENTER	enter fuel burned per year
40	press ENTER 7 times	enter defaults
41	type "E"	save
42	type "10" ENTER	return to power plant menus
43	type "10" ENTER	return to source menu

ENTER SOURCE DATA - AIRCRAFT OPERATIONS

44	type "1" ENTER	select new source (aircraft)
45	type "1" ENTER	prepare to input 1st aircraft and runway information
46	type "1" ENTER	display input screen
47	enter values listed in Table 3. Press ENTER after each entry. When finished proceed to step 48.	
48	type "C"	save data, display screen for 2nd aircraft entry.
49	enter data from Table 4	enter data for second aircraft

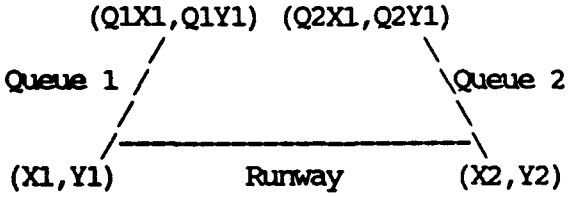
TABLE 3

O P E R A T I O N A L A I R C R A F T S O U R C E S (1)

TEMPORAL SCENARIO
Name DATA32 MAIN

Runway:
Location: Point 1 X1 1600 Y1 1050
Point 2 X2 0 Y2 900

Aircraft type AIRCFT DC9
Takeoffs(peak hour) --- 10.00
------ 100.00



Queue:
Time in Mode: QTIM 12.00

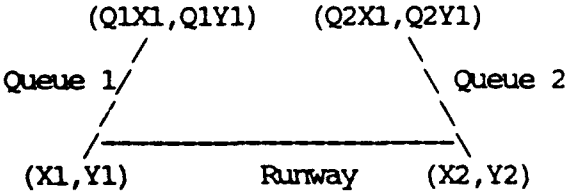
End point of queue #1: Q1X1 1500 Q1Y1 820
End point of queue #2: Q2X1 150 Q2Y1 760

QUENUM 1 (use default)

Hourly touch and go: HTGO 0.00

TABLE 4

```
                O P E R A T I O N A L   A I R C R A F T   S O U R C E S  (2)

      TEMPORAL SCENARIO
 Name  DATA32 MAIN

Runway:
 Location:  Point 1  X1 ___1600   Y1 ___1050
            Point 2  X2 _____0    Y2 ____900

 Aircraft type   AIRCFT  727____
 Takeoffs(peak hour)  ---  12.00
                      ----- 100.00

Queue:
  Time in Mode:              QTIM 12.00

  End point of queue #1:  Q1X1 ___1500  Q1Y1 ___820
  End point of queue #2:  Q2X1 ____150  Q2Y1 ___760

   QUENUM 1  (use default)

Hourly touch and go:         HTGO  0.00
```



50 type "E" save

51 type "10" ENTER return to aircraft menu

ENTER SOURCE DATA - AUTO ROADWAYS

53	type "2" ENTER	select motor vehicle source
54	type "1" ENTER	select roadway mode
55	type "1" ENTER	display screen for roadway #1
56	input data from Table 5	
57	type "C"	save data, display screen for roadway #2
58	enter data from Table 6	enter values for 2nd roadway

TABLE 5

R O A D W A Y S (1)

Temporal name TEMPORAL SCENARIO

Roadway name DATA32 NORTH TERMINAL

Vehicles/hour CAUT 340.00

Speed (mph) CVAS 15.00

Cold starts (%) CCLD 20.00

End points of road:

point 1 X1 320 Y1 500

point 2 X2 770 Y2 660

ENTER SOURCE DATA - AUTO ROADWAYS

TABLE 6

ROADWAYS (2)				
Temporal name	TEMPORAL	SCENARIO		
Roadway name	DATA32	MAIN TERMINAL		
Vehicles/hour		CAUT	1500.00	
Speed (mph)		CVAS	5.00	
Cold starts (%)		CCLD	20.00	
End points of road: point 1	X1	880	Y1	530
point 2	X2	910	Y2	610

59 type "E" save

60 type "10 ENTER return to motor vehicle menu

ENTER SOURCE DATA - AUTO PARKING

61 type "2" ENTER — select parking lot option

62 type "1" ENTER — display screen

63 input data from Table 7

TABLE 7

VEHICLE PARKING FACILITIES (lots)

Temporal name TEMPORAL SCENARIO

Parking facility DATA32 MAIN TERMINAL LOT

Average distance from gate to parking space AVED 300 (feet)

Vehicles entering/hr	VINP	150
Vehicles exiting/hr	VOUT	150
Speed (mph)	CVAS	5.00
Cold starts on exit (%)	CCLD	80.00

Four corners of Lot:

X1	870	Y1	520
X2	910	Y2	620
X3	770	Y3	580
X4	830	Y4	660

64 type "E" — save

65 type "11" ENTER — return to main menu

ENTER RECEPTORS

66	type "3" ENTER	prepare to enter receptor coordinates
67	type "1" ENTER	display receptor screen
68	enter data from Table 8	enter receptors 1 through 4

Note: After entering the first receptor, press "C" to enter the next receptor. After entering the last receptor, press "E" to end.

69	type "11" ENTER	return to main menu

TABLE 8

RECEPTORS

NAME	X	Y
RECEPTOR #1	920	600
RECEPTOR #2	1000	600
RECEPTOR #3	1650	1100
RECEPTOR #4	550	610

You have now entered all sources and receptors. The remaining tasks are:

1. run emissions model -- print results;
2. run dispersion model -- print results (screening mode);
3. run dispersion model -- print results (refined mode);
4. save data to diskette;
5. erase data from hard disk;

RUN EMISSIONS MODEL

70	type "5" ENTER	select emissions model menu
71	type "1" ENTER	run emissions model and check for errors

NOTE: If no errors were made, the main menu will reappear on the screen. When this happens, proceed to step 72 (print emission report).

If errors were made, an error message will appear. To correct these errors, identify the flow path to the appropriate screen. (Refer to Fig. 2.) Next access the screen with the error and correct it using the Revise (R) command. Finally, rerun the emissions model. (Return to steps 70 and 71.)

PRINT EMISSION OUTPUT

72	type "2" ENTER	print emission report
73	type "11" ENTER	return to main menu

RUN DISPERSION MODEL IN SCREENING MODE -- PRINT RESULTS

74	type "6" ENTER	initiate dispersion modeling sequence
75	type "1" ENTER	run dispersion model for all sources
76	type "S" ENTER	select screening mode
77	type "1" ENTER	enter one hour
78	type "70" ENTER	enter temperature in degrees F
79	type "1" ENTER	enter wind speed
80	type "225" ENTER	enter wind direction
81	type "2" ENTER	enter stability class
82	type "Y" ENTER	initiate dispersion model calculation
83	type "3" ENTER	print screening dispersion report

RUN DISPERSION MODEL IN REFINED MODE -- PRINT RESULTS

84	type "1" ENTER	run dispersion model for all sources
85	type "R" ENTER	select refined mode
86	type "8, 11, 08" ENTER	enter starting time (Aug 11 - 8:00 am)
87	type "8, 11, 09" ENTER	enter ending time (Aug 11 - 9:00 am)
88	type "4" ENTER	print refined dispersion report
89	type "11" ENTER	return to main menu

SAVE AND ERASE DATA

90	type "8" ENTER	display save, delete, and restore options
91	type "1" ENTER (follow screen instructions)	save airport scenario on floppy diskette
92	type "2" ENTER type "Y" ENTER	erase saved scenario from hard disk This action clears the hard disk to accept new scenario data
93	type "11" ENTER	return to main menu
94	type "10" ENTER	leave the EDMS program and return to DOS

5. - GENERAL TASKS

5.1 ENTERING AIRCRAFT QUEUES

The user must enter two possible queue locations, one at each end of a runway. This is necessary because the model automatically selects the queue location associated with takeoff into the wind.

The number of queueing aircraft is determined either by observing queue length at peak hour or by multiplying estimated peak hour Time In Mode (TIM) —in minutes — by the estimated peak hour departure rate — in airplanes per minute. Having calculated the number of queueing aircraft, queue length is determined by adding up the length of all aircraft and the spaceing between them.

The queue line extends from the end of the runway where aircraft first start their takeoff roll to the location on the taxiway where the last aircraft is queueing. This queueing approximation will have an insignificant effect on model results.

5.2 ENTERING LONG-TERM METEOROLOGICAL DATA

The National Climatic Data Center (NCDC) distributes AIRWAY SURFACE OBSERVATION files for each weather station in the United States. Before a refined run can start, these files must be entered into EDMS. (Files can be obtained by contacting the NCDC in Ashville, North Carolina 28801). The procedure for entering these files is as follows:

1- Enter EDMS (follow steps noted on page 13)

2- Execute item 9 of the main menu and follow instructions.

After entering a new weather station file, the weather station default file, which is for 1982 hourly weather observations at Stapleton International Airport (DEN), will be overwritten.

5.3 CHANGING THE MOTOR VEHICLE FLEET MIX YEAR

Emission rate (standards) files for 1990, 1995, 2000, and 2010 fleet mixes have been loaded into EDMS in accordance with Mobile 4 information provided by the EPA in June 1988. The user can select emission information for any one of these 4 years by selecting option 7 of the main menu and following the instructions that appear on the screen. When this is done, the file default, 1990 - high altitude, is overwritten.

As new issues of Mobile 4 are released, they will be incorporated into EDMS. The user should check with the model issuer to determine what version of Mobile 4 has been loaded into his version of the model.

5.4 VIEWING EMISSION RATE FILES

Exercising option 7 of the main menu will provide access to all emission rate information.

5.5 PRINTING OUT AIRCRAFT IDENTIFIERS

Explicit aircraft names (i.e. 737; not B737) must be entered into EDMS to avoid an error message. Option 7 of the main menu permits access to the specific aircraft names that EDMS will accept.

5.6 RESTORING AN OLD SCENARIO

Option 7 can also be used to restore previously saved scenarios. However, make sure that the scenario being restored was saved on same version of EDMS that you are using.

5.7 RETRIEVING DISPERSION RESULTS

Dispersion results are written to a text file called DISPERSE.OUT. Option 6 of the main menu initiates access to this file.

6. - GENERAL INFORMATION

6.1 OPERATIONAL CONSTRAINTS IN ENTERING DATA AND RUNNING THE MODEL

6.1.1 DATA INPUT LIMITS

STANDARDS:

FILE NAME	FILE DESCRIPTION	RECORD LIMIT	
AIRZ	Aircraft	648	(81 acrft * 8 geomodes)
MVEM	Motor Vehicles	60	
TFEM	Training Fires	13	
PPEF	Power Plants	22	
INEF	Incinerators	5	
TNEF	Tank Farms	117	(13 fuel types * 9 temp.)

SOURCES:

ACTH	Temporal	30	
RUNW	Aircraft Takeoffs	162	(ie. 4 runways * 41 acrft)
VTES	Engine Tests	10	
ROAD	Roadways	300	
VPRL	Car Parking	30	
TANK	Tank Farms	20	
FIRE	Training Fires	20	
PLAN	Power Plants	20	
HEAT	Heating Plants	20	
INCI	Incinerators	20	

RECEPTORS:

RECP	Receptors	200	

6.1.2 DATA PROCESSING CONSTRAINTS

This section provides information on the time it takes to run the model and the amount of disk storage space needed to store modeling results. Table 9 lists the characteristics of 7 scenarios that were run during model development. These scenarios were run on a 386 — 25 Mhz computer with an 80387 math coprocessor

TABLE 9

MODEL PROCESSING CHARACTERISTICS

NUMBER OF SOURCES	RECEPTORS	WEATHER HOURS	RUNTIME HOURS	DISK STORAGE (megabytes)
Scenario #1 Roadways: 2 Parking lots: 1 Power Plants: 1 Aircraft Types: 2	4	1	<.1	<.1
Scenario #2 Roadways: 5 Parking lots: 1 Heating Plants: 1 Training Fires: 1 Fuel Tanks: 2 Aircraft Types: 7	7	5	<.1	<.1
Scenario #3 Roadways: 27 Aircraft Types: 9	7	5	<.1	<.1
Scenario #4 Roadways: 11 Parking lots: 6 Power Plants: 3 Incinerators: 1 Fuel Tanks: 15 Aircraft Types 14	7	5	.1	<.1
Scenario #5 Roadways: 5 Parking lots: 1 Heating Plants: 1 Training Fires: 1 Fuel Tanks: 2 Aircraft Types 7	200	5	1.7	.7
Scenario #6 Roadways: 27 Aircraft Type 9	200	5	2.0	.3
Scenario #7 Roadways: 11 Parking lots: 6 Power Plants: 3 Incinerators: 1 Fuel Tanks: 15 Aircraft Type:14	200	5	4.5	.8

TABLE 9-cont.

MODEL PROCESSING CHARACTERISTICS

NUMBER OF SOURCES	RECEPTORS	HOURS RUN	MODEL RUNTIME (hours)	DISK STORAGE (megabytes)
Scenario #8 Aircraft Type 14	1	8760	8	1
Scenario #9 Aircraft Type 14	2	8760	23	3
Scenario #10 Roadways: 11 Parking lots: 6 Power Plants: 3 Incinerators: 1 Fuel Tanks: 15 Aircraft Types 14	1	8760	13	9
Scenario #11 Roadways: 11 Parking lots: 6 Power Plants: 3 Incinerators: 1 Fuel Tanks: 15 Aircraft Types 14	3	8760	48	26

6.2 TEMPORAL FACTORS

6.2.1 DESCRIPTION OF TEMPORAL FACTORS

All sources are related to a set of temporal factors that can range from 0 (for 0 percent activity) to 1 (for 100 percent activity). Factors within this range are entered into the month, day, and hour fields of the temporal screen. By multiplying the nested month, day, and hour field values together, activity for any hour of the year can be determined.

6.2.2 RELATIONSHIP BETWEEN PEAK AND ANNUAL ACTIVITY

The user may want to determine peak hour activity knowing only annual activity or may want to determine annual activity knowing only peak hour activity. The mathematical relationship between peak hour and annual activity is stated below.

(1) peak hour activity = annual activity / hours in year / factor average (month) / factor average (week) /factor average (hour)

(2) annual activity = peak hour activity * hours in year * factor average (month) * factor ave (week) * factor average (hour)

Calculated peak hour values can vary substantially when different temporal factors are used. This difference is emphasized when constant (or non-variable) factors are compared to variable factors. A listing of variable and non-variable factors is tabulated below.

MONTHLY TEMPORAL FACTORS AND THEIR AVERAGES

MONTH	NON-VARIABLE FACTORS	VARIABLE FACTORS
JANUARY	1.0	0.3 (30%)
FEBRUARY	1.0	0.3
MARCH	1.0	0.4
APRIL	1.0	0.3
MAY	1.0	0.3
JUNE	1.0	0.4
JULY	1.0	0.5
AUGUST	1.0	0.5
SEPTEMBER	1.0	0.6
OCTOBER	1.0	0.6
NOVEMBER	1.0	0.8
DECEMBER	1.0	1.0
TOTAL	12.0	6.0
FACTOR AVERAGE	1.0	0.5

Let us assume that the variable and non-variable factor averages (1.0 and 0.5 from the table) apply weekly and hourly as well. Values to be entered into equation (1) are therefore:

		VARIABLE	NON-VARIABLE
FACTOR AVERAGE - MONTH	(from table)	0.5	1.0
FACTOR AVERAGE - WEEK	(assumed same)	0.5	1.0
FACTOR AVERAGE - HOUR	(assumed same)	0.5	1.0
ANNUAL OPERATIONS	(assumed)	17,520	17,520

HOURS IN A YEAR -- 8760

THEN:

NON-VARIABLE FACTOR CALCULATION

17,520 / 8760 / 1 / 1 / 1 = 2 peak hour departures.

VARIABLE FACTOR CALCULATION

17,520 / 8760 / .5 / .5 /.5 = 16 peak hour departures

Notice that the peak hour departures are quite different even though the annual operations are the same -- 17,520 departures.

6.3 FUEL CODES

Fuel code names are listed in Table 10.

TABLE 10

FUEL CODES

FUEL CODE	NAME	USAGE	
		STORAGE TANKS	TRAINING FIRES
1	Anthracite Coal	*	*
2	Bituminous Coal	*	*
3	Fuel Oil	3	
4	Natural Gas	4	
5	Liquid Petroleum Gas		5
6	Diesel	6	
7	Waste	*	*
8	Automobile Gasoline	8	
9	Aviation Gasoline	9	
10	JP4	10	10
11	JP5	11	
12	JP8	12	
13	JET A	13	

* Fuel codes are not used with incinerators or power/heating plants.

6.4 AIRCRAFT MODES AND TIMES IN MODE

The model refers to eight Geomodes, each of which has a different TIME IN MODE (TIM). (A Geomode is the title given to an aircraft operation such as taxi or takeoff.) The relationship of EDMS Geomodes to EPA TIMES IN MODE are listed in Table 11.

TABLE 11

EDMS MODES ASSIGNED TO CIVIL AIRCRAFT

EDMS MODES	EPA MODES	EPA TIMES IN MODE (MIN)		
		TURBO FAN* TURBO JET	TURBO* PROP	PISTON**
1 - RUNWAY TAKEOFF	TAKEOFF	0.7	0.5	0.3
2 - RUNWAY QUEUE	***RUNWAY QUEUE	12.0	12.0	4.0
3 - TOUCH AND GO				
4 - TAXIWAY CYCLE	***TAXI OUT	7.0	7.0	8.0
	***TAXI IN	7.0	7.0	4.0
5 - AIRCRAFT PARKING				
6 - ENGINE TESTING				
7 - CLIMB	CLIMB	2.2	2.5	6.0
8 - APPROACH	APPROACH	4.0	4.5	6.0

* Page 58473, Federal Register, December 30, 1982 (Final Engine Emission Standards

** Page 19101, Federal Register, July 17, 1973 (Initial Engine Emission Standards)

*** 26 minute EPA taxi-idle time in mode breakdown (estimated)

6.5 HARD DRIVE DESIGNATION

EDMS will operate properly only when it is loaded into the "C" drive. Future versions of the model will be modified to permit operation with other drives (i.e. D,E,F,)

6.6 TEXT CHARACTERS

All data fields should contain only numeric and/or alphabetic characters. The introduction of other characters, such as semicolons or commas, will distort file writing procedures and will cause an error message to appear.

REFERENCES

Condor 1983; Condor 3 Database Management System - User's Guide; Condor Computer Corporation; P.O. Box 8318; Ann Arbor, MI.; 1983

EPA 1983; Compilation of Air Pollution Emission Factors - AP-42 Supplements 8 through 14; Environmental Protection Agency; Research Triangle Park, N.C.; June 1982 - May 1983

EPA 1985; Compilation of Air Pollutant Emission Factors - Volume II: Mobile Sources; Environmental Protection Agency; Ann Arbor, MI; September 1985

Rote D. M. and Wangan L. E. ; A Generalized Air Quality Assessment Model for Air Force Operations"; Air Force Weapons Laboratory, Kirkland Air Force Base, New Mexico; USAF Report #AFWL -TR -74 -304; Feb. 1975

Segal H. M.; A Simplified Atmospheric Dispersion Model for Airport Use (User's Guide); Federal Aviation Administration,; Washington, D. C.; Report FAA-EE-81-8; July 1981

Segal H. M.; Microcomputer Graphics in Atmospheric Dispersion Modeling; Journal of the Air Pollution Control Association; 23:6; June 1983

Segal H. M. and Hamilton P. L.; A Microcomputer Pollution Model For Civilian Airports and Air Force Bases -- Model Description ; Federal Aviation Administration; Washington, D. C. 20591; Report # FAA-EE-88-4 ESL-TR-88-41 August 1988

Wang I. T., Conley D. M., Rote D. M.; Airport Vicinity Air Pollution Model User's Guide"; Argonne National Laboratory, Argonne, Ill.; 1973

APPENDIX A

PRINTOUT OF EXAMPLE PROBLEM RESULTS

OVERVIEW

In this appendix, the first page of the emissions inventory report and all pages of the dispersion reports are printed out.

EMISSION REPORT
(all values are in grams)

ROADWAYS

NORTH TERMINAL

	CARBON MONOXIDE	HYDROCARBONS	NITROGEN OXIDES	SULPHUR OXIDES	PARTICULATES
JANUARY	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
FEBRUARY	2.786E+06	2.042E+05	1.456E+05	1.228E+02	8.150E+02
MARCH	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
APRIL	2.959E+06	2.168E+05	1.546E+05	1.304E+02	8.655E+02
MAY	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
JUNE	2.959E+06	2.168E+05	1.546E+05	1.304E+02	8.655E+02
JULY	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
AUGUST	1.834E+06	1.344E+05	9.585E+04	8.084E+01	5.366E+02
SEPTEMBER	2.959E+06	2.168E+05	1.546E+05	1.304E+02	8.655E+02
OCTOBER	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
NOVEMBER	2.959E+06	2.168E+05	1.546E+05	1.304E+02	8.655E+02
DECEMBER	3.057E+06	2.241E+05	1.597E+05	1.347E+02	8.943E+02
ANNUAL	3.480E+07	2.550E+06	1.818E+06	1.534E+03	1.018E+04

MAIN TERMINAL

	CARBON MONOXIDE	HYDROCARBONS	NITROGEN OXIDES	SULPHUR OXIDES	PARTICULATES
JANUARY	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
FEBRUARY	5.761E+06	4.407E+05	1.468E+05	9.691E+01	6.432E+02
MARCH	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
APRIL	6.118E+06	4.680E+05	1.559E+05	1.029E+02	6.831E+02
MAY	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
JUNE	6.118E+06	4.680E+05	1.559E+05	1.029E+02	6.831E+02
JULY	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
AUGUST	3.793E+06	2.902E+05	9.666E+04	6.380E+01	4.235E+02
SEPTEMBER	6.118E+06	4.680E+05	1.559E+05	1.029E+02	6.831E+02
OCTOBER	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
NOVEMBER	6.118E+06	4.680E+05	1.559E+05	1.029E+02	6.831E+02
DECEMBER	6.322E+06	4.836E+05	1.611E+05	1.063E+02	7.059E+02
ANNUAL	7.196E+07	5.505E+06	1.834E+06	1.210E+03	8.034E+03

DISPERSION REPORT

(Screening Mode)

ROADWAYS

EMISSION INFORMATION													
INPUT										OUTPUT			
SOURCE COORDINATES (m)					(MOBILE 4)					EMISSION RATES (gm/sec)			
ROAD #	X1	Y1	X2	Y2	CARS/HR	MPH	%COLD START	TEMP (F)	YEAR	CO	HC	NOx	SOx	PART
1	320,	500	770,	660	340	15	20	70	1990	1.17E+00	8.54E-02	6.09E-02	5.14E-05	3.41E-04
2	880,	530	910,	610	1500	5	20	70	1990	2.41E+00	1.84E-01	6.14E-02	4.05E-05	2.69E-04

DISPERSION REPORT												
INPUT								OUTPUT				
				RECEPTORS (m)				CONCENTRATIONS (gm/m^3)				
HR	DATE	W/S m/s	WD DEG	P/G A=1	NO.	X	Y	CO	HC	NOx	SOx	PART
0	JAN- 1-00	1	225	2	1	920	600	6.31E-03	4.83E-04	1.61E-04	1.06E-07	7.05E-07
0	JAN- 1-00	1	225	2	2	1000	600	1.19E-04	9.12E-06	3.04E-06	2.01E-09	1.33E-08
0	JAN- 1-00	1	225	2	3	1650	1100	1.98E-05	1.51E-06	5.24E-07	3.53E-10	2.34E-09
0	JAN- 1-00	1	225	2	4	550	610	3.42E-04	2.51E-05	1.79E-05	1.51E-08	1.00E-07

P A R K I N G L O T S

EMISSION INFORMATION																
INPUT												OUTPUT				
SOURCE COORDINATES (m)								(MOBILE 4)				EMISSION RATES (gm/sec)				
LOT #	X1	Y1	X2	Y2	X3	Y3	X4	Y4	CARS/ HR	MIN/ CAR	TEMP (F)	YEAR	CO	HC	NOx	SOx	PART
1	870,	520	910,	620	770,	580	830,	660	150	.681	70	1990	4.6E-01	3.6E-02	8.2E-03	4.3E-06	2.9E-05

DISPERSION REPORT													
INPUT									OUTPUT				
					RECEPTORS (m)				CONCENTRATIONS (gm/m^3)				
HR	DATE	W/S m/s	WD DEG	P/G A=1	NO.	X	Y		CO	HC	NOx	SOx	PART
0	JAN- 1-00	1	225	2	1	920	600		2.49E-04	1.95E-05	4.45E-06	2.35E-09	1.56E-08
0	JAN- 1-00	1	225	2	2	1000	600		4.88E-06	3.82E-07	8.73E-08	4.60E-11	3.05E-10
0	JAN- 1-00	1	225	2	3	1650	1100		3.54E-06	2.78E-07	6.34E-08	3.34E-11	2.21E-10
0	JAN- 1-00	1	225	2	4	550	610		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

P O W E R P L A N T S

EMISSION INFORMATION								
INPUT			OUTPUT					
SOURCE COORDS(m)			EMISSION RATES (gm/sec)					
REC#	X1	Y1	NAME	CO	HC	NOx	SOx	PART
1	800,	400	PUGET POWER #1	3.33E-01	6.11E-02	8.33E+00	4.33E+01	8.67E+01

DISPERSION REPORT

INPUT								OUTPUT				
					RECEPTORS (m)			CONCENTRATIONS (gm/m^3)				
HR	DATE	W/S m/s	WD DEG	P/G A=1	NO.	X	Y	CO	HC	NOx	SOx	PART
0	JAN- 1-00	1	225	2	1	920	600	5.11E-08	9.38E-09	1.28E-06	6.65E-06	1.33E-05
0	JAN- 1-00	1	225	2	2	1000	600	1.18E-06	2.17E-07	2.96E-05	1.54E-04	3.08E-04
0	JAN- 1-00	1	225	2	3	1650	1100	3.51E-06	6.44E-07	8.78E-05	4.56E-04	9.13E-04
0	JAN- 1-00	1	225	2	4	550	610	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

No heating plant sources were entered

No incinerator sources were entered

No training fire sources were entered

No fuel tank sources were entered

No surface coating sources were entered

A I R C R A F T - Q U E U E S

EMISSION INFORMATION

INPUT								OUTPUT				
SOURCE COORDINATES (m)								EMISSION RATES (gm/sec)				
REC #	X1	Y1	X2	Y2	ACFT/ HR	AIRCRAFT TYPE	TIME IN MODE	CO	HC	NOx	SOx	PART
1	1500,	820	1600,	1050	10	DC9	12.00	1.97E+01	5.09E+00	1.97E+00	5.78E-01	1.78E-01
2	1500,	820	1600,	1050	12	727	12.00	3.55E+01	9.16E+00	3.54E+00	1.04E+00	3.20E-01

DISPERSION REPORT

INPUT							OUTPUT				
				RECEPTORS (m)			CONCENTRATIONS (gm/m^3)				
HR	DATE	W/S m/s	WD DEG	P/G A=1	NO.	X	Y	CO	HC	NOx	SOx	PART
0	JAN- 1-00	1	225	2	1	920	600	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	JAN- 1-00	1	225	2	2	1000	600	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	JAN- 1-00	1	225	2	3	1650	1100	1.54E-02	3.97E-03	1.53E-03	4.50E-04	1.39E-04
0	JAN- 1-00	1	225	2	4	550	610	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

A I R C R A F T - T A K E O F F S

EMISSION INFORMATION

INPUT						OUTPUT				
SOURCE COORDINATES (m)						EMISSION RATES (gm/sec)				
REC #	X1	Y1	X2	Y2	ACFT/ HR	AIRCRAFT TYPE	CO	HC	NOx	SOx	PART
1	1600,	1050	0,	900	10	DC9	2.05E-01	1.43E-02	5.96E+00	2.94E-01	1.10E-01
2	1600,	1050	0,	900	12	727	3.70E-01	2.57E-02	1.07E+01	5.29E-01	1.98E-01

DISPERSION REPORT

INPUT							OUTPUT				
				RECEPTORS (m)			CONCENTRATIONS (gm/m^3)				
HR	DATE	W/S m/s	WD DEG	P/G A=1	NO.	X	Y	CO	HC	NOx	SOx	PART
0	JAN- 1-00	1	225	2	1	920	600	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	JAN- 1-00	1	225	2	2	1000	600	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	JAN- 1-00	1	225	2	3	1650	1100	1.23E-04	8.51E-06	3.55E-03	1.75E-04	6.57E-05
0	JAN- 1-00	1	225	2	4	550	610	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CONCENTRATION - ALL SOURCES

INPUT								OUTPUT				
					RECEPTORS (m)			CONCENTRATIONS (gm/m^3)				
DATE	HR	W/S m/s	WD DEG	P/G A=1	NO.	X	Y	CO	HC	NOx	SOx	PART
JAN- 1-00	0	1	225	2	1	920	600	6.56E-03	5.02E-04	1.67E-04	6.76E-06	1.40E-05
JAN- 1-00	0	1	225	2	2	1000	600	1.25E-04	9.72E-06	3.27E-05	1.54E-04	3.08E-04
JAN- 1-00	0	1	225	2	3	1650	1100	1.55E-02	3.98E-03	5.17E-03	1.08E-03	1.12E-03
JAN- 1-00	0	1	225	2	4	550	610	3.42E-04	2.51E-05	1.79E-05	1.51E-08	1.00E-07

CONCENTRATION - BY SOURCE TYPE

CARBON MONOXIDE (gm/m^3)

DATE	HOUR	RECP	ROADWAYS	PARKING	POWER PLANTS	HEATING PLANTS	INCINER-ATORS	TRAINING FIRES	FUEL FACILITY	SURFACE COATING	AIRCRAFT QUEUES	AIRCRAFT TAKEOFFS
JAN- 1-00	0	1	6.312E-03	2.491E-04	5.115E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
JAN- 1-00	0	2	1.193E-04	4.883E-06	1.183E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
JAN- 1-00	0	3	1.976E-05	3.543E-06	3.511E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.536E-02	1.226E-04
JAN- 1-00	0	4	3.418E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

NITROGEN OXIDES (gm/m^3)

DATE	HOUR	RECP	ROADWAYS	PARKING	POWER PLANTS	HEATING PLANTS	INCINER-ATORS	TRAINING FIRES	FUEL FACILITY	SURFACE COATING	AIRCRAFT QUEUES	AIRCRAFT TAKEOFFS
JAN- 1-00	0	1	1.609E-04	4.455E-06	1.279E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
JAN- 1-00	0	2	3.039E-06	8.732E-08	2.957E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
JAN- 1-00	0	3	5.240E-07	6.336E-08	8.777E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.532E-03	3.553E-03
JAN- 1-00	0	4	1.786E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

AVERAGE CONCENTRATION FOR 1 HOURS (gm/m^3)

SOURCE	RECP	CO	HC	NOx	SOx	PART
ROADWAYS	1	6.31E-03	4.83E-04	1.61E-04	1.06E-07	7.05E-07
	2	1.19E-04	9.12E-06	3.04E-06	2.01E-09	1.33E-08
	3	1.98E-05	1.51E-06	5.24E-07	3.53E-10	2.34E-09
	4	3.42E-04	2.51E-05	1.79E-05	1.51E-06	1.00E-07
PARKING LOTS	1	2.49E-04	1.95E-05	4.45E-06	2.35E-09	1.56E-08
	2	4.88E-06	3.82E-07	8.73E-08	4.60E-11	3.05E-10
	3	3.54E-06	2.78E-07	6.34E-08	3.34E-11	2.21E-10
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POWER PLANTS	1	5.11E-08	9.38E-09	1.28E-06	6.65E-06	1.33E-05
	2	1.18E-06	2.17E-07	2.96E-05	1.54E-04	3.08E-04
	3	3.51E-06	6.44E-07	8.78E-05	4.56E-04	9.13E-04
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HEATING PLANTS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INCINERATORS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRAINING FIRES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FUEL FACILITIES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SURFACE COATING	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AIRCRAFT-QUEUES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	1.54E-02	3.97E-03	1.53E-03	4.50E-04	1.39E-04
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AIRCRAFT-TAKEOFFS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	1.23E-04	8.51E-06	3.55E-03	1.75E-04	6.57E-05
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL-ALL SOURCES	1	6.56E-03	5.02E-04	1.67E-04	6.76E-06	1.40E-05
	2	1.25E-04	9.72E-06	3.27E-05	1.54E-04	3.08E-04
	3	1.55E-02	3.98E-03	5.17E-03	1.08E-03	1.12E-03
	4	3.42E-04	2.51E-05	1.79E-05	1.51E-08	1.00E-07

DISPERSION REPORT

(Refined Mode)

AVERAGE CONCENTRATION FOR 2 HOURS (gm/m^3)

SOURCE	RECP	CO	HC	NOx	SOx	PART
ROADWAYS	1	1.32E-03	1.02E-04	2.95E-05	1.87E-08	1.24E-07
	2	7.69E-05	5.93E-06	1.73E-06	1.10E-09	7.28E-09
	3	6.45E-06	4.93E-07	1.69E-07	1.15E-10	7.62E-10
	4	4.68E-05	3.42E-06	2.16E-06	1.75E-09	1.16E-08
PARKING LOTS	1	6.19E-05	5.03E-06	8.97E-07	4.57E-10	3.03E-09
	2	2.87E-06	2.33E-07	4.15E-08	2.11E-11	1.40E-10
	3	2.61E-06	2.12E-07	3.78E-08	1.92E-11	1.28E-10
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POWER PLANTS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	1.01E-07	1.86E-08	2.54E-06	1.32E-05	2.64E-05
	3	1.57E-06	2.89E-07	3.94E-05	2.05E-04	4.09E-04
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HEATING PLANTS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INCINERATORS	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRAINING FIRES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FUEL FACILITIES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SURFACE COATING	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AIRCRAFT-QUEUES	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	3	1.57E-03	4.05E-04	1.56E-04	4.60E-05	1.41E-05
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AIRCRAFT-TAKEOFFS	1	3.88E-06	2.69E-07	1.13E-04	5.55E-06	2.08E-06
	2	4.06E-06	2.82E-07	1.18E-04	5.80E-06	2.18E-06
	3	1.84E-05	1.27E-06	5.32E-04	2.62E-05	9.85E-06
	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL-ALL SOURCES	1	1.39E-03	1.07E-04	1.43E-04	5.57E-06	2.21E-06
	2	8.40E-05	6.46E-06	1.22E-04	1.90E-05	2.86E-05
	3	1.60E-03	4.07E-04	7.28E-04	2.77E-04	4.33E-04
	4	4.68E-05	3.42E-06	2.16E-06	1.75E-09	1.16E-08